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SEQUENCE LISTING

<110> Melbourne Health
 Southern Health
 5 Austin Health
 St. Vincent's Hospital (Melbourne) Ltd. trading as St. Vincent's
 Hospital Melbourne
 Bayside Health
 BARTHOLOMEUSZ, Angeline, Ingrid (US Only)
 10 LOCARNINI, Stephen, Alister (US Only)
 AYRES, Anna (US Only)
 YUEN, Lilly, Ka, Wai (US Only)
 SASADEUSZ, Joseph, John (US Only)

15 <120> Viral Variants; Detection and Application
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<150> AU2003905776
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 <150> AU2004900962
 <151> 2004-02-25

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 50 55 60
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25 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
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30 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
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45 Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
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50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
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 85 90 95

55 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110

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10	Met Gln Asn Leu His Asp Ser Cys Ser Arg Lys Leu Tyr Val Ser Leu 130 135 140
15	Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His 145 150 155 160
20	Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser 165 170 175
25	Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg 180 185 190
30	Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val 195 200 205
35	Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val 210 215 220
40	Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr 225 230 235 240
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10 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
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15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
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30 Gln Gly Asn Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
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35 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
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40 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
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45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
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50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile
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5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
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10 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
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15 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
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20 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
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25 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
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30 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
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35 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
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40 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
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45 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

50 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

55 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
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25 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60

30 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
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40 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
 115 120 125

45 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
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50 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
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Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
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Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu

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 65 70 75 80
 30 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
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 35 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110
 40 Ala Arg Leu Ser Ser Thr Ser Arg Asn Val Asn Tyr Gln His Gly Thr
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 45 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
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 50 Met Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
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 55 Pro Phe Leu Leu Thr Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
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 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val

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5 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile
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10 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
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40 Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile Val
   35              40              45

Asn Leu Leu Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His
45 50              55              60

Ile Arg Ile Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu
65 70              75              80

50 Val Asp Lys Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp
   85              90              95

55 Phe Ser Gln Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe
   100             105             110

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Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu
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5 Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu
 130 135 140

10 His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro
 145 150 155 160

15 Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln
 165 170 175

20 His Gly Thr Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr
 180 185 190

Val Ser Leu Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu
 195 200 205

25 Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val
 210 215 220

30 Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser
 225 230 235 240

35 Val Val Arg Arg Ala Phe Pro His Cys Leu Val Phe Ser Tyr Val Asp
 245 250 255

40 Asp Val Val Leu Gly Ala Lys Ser Ala Gln His Leu Glu Ser Leu Phe
 260 265 270

Thr Ala Ile Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Xaa
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45 Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Gly
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50 Ile Gly Ser Trp Gly
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 <212> PRT
 <213> hepatitis B virus

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 5 <223> Xaa is any amino acid

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 25 Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val
 35 40 45
 30 Asn Pro Val Pro Thr Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg
 50 55 60
 Thr Gly Asp Pro Ala Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu
 65 70 75 80
 35 Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile
 85 90 95
 40 Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe
 100 105 110
 45 Leu Gly Gly Ala Pro Ala Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr
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 50 Ser Asn His Ser Leu Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg
 130 135 140
 Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu
 145 150 155 160
 55 Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro
 165 170 175

- 18 -

5 Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys
 180 185 190
 Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys
 195 200 205
 10 Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro
 210 215 220
 15 Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg
 225 230 235 240
 20 Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly
 245 250 255
 25 Leu Ser Pro Thr Val Trp Phe Ser Val Met Trp Met Met Trp Tyr Trp
 260 265 270
 Gly Pro Ser Leu His Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro
 275 280 285
 30 Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa Thr Xaa Ile Lys Pro Asn
 290 295 300
 35 Val Gly Ala
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- 19 -

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 cctgcaagac tctgctcaa ggaacctcta tgtttccctc ttgttgctgt acaaacctt 660
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 gggagtgggc ctcagtccgt ttctcctggc tcagtttact agtgccatth gttcagtgg 780
 15 tcgtagggct ttccccact gtttggtttt cagttatatg gatgatgtgg tattgggggc 840
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 20 atatgtaatt ggaagttggg gtaccttg 988

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 <211> 258
 25 <212> PRT
 <213> hepatitis B virus

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35 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

40 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

45 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

55 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

- 20 -

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
115 120 125

5 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
130 135 140

10 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

15 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

20 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

25 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

30 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
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Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
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35 Trp Gly

40 <210> 18
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<213> hepatitis B virus

45 <400> 18

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55 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
35 40 45

- 21 -

5 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

10 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

20 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
100 105 110

25 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
115 120 125

30 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

35 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

40 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

55 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Tyr Ile
225

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<212> DNA
<213> hepatitis B virus

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- 22 -

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 5 gcaagatccc agagtgaggg gcctgtatct ccctgctggt ggctccagtt caggaacagc 180
 aaaccctggt ccgactactg cctctcgctt atcgtcaatc ttctcgagga ttggggaccc 240
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 35 atactaaaaa tcaaagattg ttt 1043

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 40 <213> hepatitis B virus
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50 Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

55 Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

- 23 -

5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asp Leu Ser Trp Leu
 65 70 75 80

10 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala
 85 90 95

15 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110

20 Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Asn
 115 120 125

25 Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

30 Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

35 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

40 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

45 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

50 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

55 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Thr Pro Asn Lys Thr
 225 230 235 240

60 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
 245 250 255

65 Tyr Gly

70 <210> 21
 <211> 226
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- 24 -

<213> hepatitis B virus

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 10 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
 20 25 30
 15 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
 35 40 45
 Leu Gly Gln Asn Ser Arg Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 20 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
 65 70 75 80
 25 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95
 30 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 100 105 110
 35 Ser Ser Thr Thr Ser Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125
 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 40 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
 145 150 155 160
 45 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 50 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 55 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile
 195 200 205
 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val

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20	accctgttcc gaccactgcc tctcccttat cgtcaatctt ctcgaggatt ggggaccctg		240	
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	cgggaccatg ccgaacctgc acgactcctg ctcaaggaac ctctatgtat ccctcctggt		660	
35	gctgtaccaaa accttcggac ggaaattgca cctgtattcc catcccatca tcttgggctt		720	
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	tgtgggtattg ggggccaagt ctgtatcgca tcttgagtcc cttttaccg ctgttaccac		900	
	ttttcttttg tctttgggta tacatttaaa ccctaacaaa acgaaaagat ggggttactc		960	
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	<211> 264			
	<212> PRT			
	<213> hepatitis B virus			
55	<400> 23			

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10	Asn	Pro	His	Asn	Thr	Ala	Glu	Ser	Arg	Leu	Val	Val	Asp	Phe	Ser	Gln	
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15	Phe	Ser	Arg	Gly	Asn	His	Arg	Val	Ser	Trp	Pro	Lys	Phe	Ala	Val	Pro	
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20	Asn	Leu	Gln	Ser	Leu	Thr	Asn	Leu	Leu	Ser	Ser	Asn	Leu	Ser	Trp	Leu	
	65					70					75					80	
25	Ser	Leu	Asp	Val	Ser	Ala	Ala	Phe	Tyr	His	Ile	Pro	Leu	His	Pro	Ala	
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30	Ala	Met	Pro	His	Leu	Leu	Val	Gly	Ser	Ser	Gly	Leu	Ser	Arg	Tyr	Val	
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35	Ala	Arg	Leu	Ser	Ser	Asn	Ser	Arg	Ile	Leu	Asn	His	Gln	His	Gly	Thr	
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40	Met	Pro	Asn	Leu	His	Asp	Ser	Cys	Ser	Arg	Asn	Leu	Tyr	Val	Ser	Leu	
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45	Leu	Leu	Leu	Tyr	Gln	Thr	Phe	Gly	Arg	Lys	Leu	His	Leu	Tyr	Ser	His	
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50	Pro	Ile	Ile	Leu	Gly	Phe	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu	Ser	
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55	Pro	Phe	Leu	Met	Ala	Gln	Phe	Thr	Ser	Ala	Ile	Cys	Ser	Val	Val	Arg	
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60	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Val	Asp	Asp	Val	Val	
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65	Leu	Gly	Ala	Lys	Ser	Val	Ser	His	Leu	Glu	Ser	Leu	Phe	Thr	Ala	Val	
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70	Thr	Asn	Phe	Leu	Leu	Ser	Leu	Gly	Ile	His	Leu	Asn	Pro	Asn	Lys	Thr	

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10 Tyr Gly Ser Leu Pro Gln Glu His
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25 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
   20          25          30
30 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Glu Thr Thr Val Cys
   35          40          45
35 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
   50          55          60
40 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
   65          70          75          80
45 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
   85          90          95
50 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
   100          105          110
55 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
   115          120          125
60 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
   130          135          140
65 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
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				180					185					190			
10	Ser	Val	Met	Trp	Met	Met	Trp	Tyr	Trp	Gly	Pro	Ser	Leu	Tyr	Arg	Ile	
			195					200					205				
15	Leu	Ser	Pro	Phe	Leu	Pro	Leu	Leu	Pro	Ile	Phe	Phe	Cys	Leu	Trp	Val	
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20	Tyr	Ile															
	225																
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	gtcctctact	tccaggatct	tcaaccacca	gcacgggtcc	atgcagaacc	tgcacgactc											180
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      35                                40                                45

10     His Gln His Gly Ser Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn
      50                                55                                60

15     Leu Tyr Val Ser Leu Met Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu
      65                                70                                75                                80

20     His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met
      85                                90                                95

25     Gly Val Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile
      100                               105                               110

30     Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr
      115                               120                               125

35     Val Asp Asp Val Val Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser
      130                               135                               140

35     Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu
      145                               150                               155                               160

40     Asn Pro His Lys Thr Lys Arg Trp Gly Tyr Ser Leu His Phe Met Gly
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45     Tyr Val Ile Gly Cys Tyr Gly Ser Leu Pro
      180                               185

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<211>  160
<212>  PRT
50     <213>  hepatitis B virus

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55     <223>  Xaa is any amino acid

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 35 40 45
 15 Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr
 50 55 60
 20 Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys
 65 70 75 80
 Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp
 85 90 95
 25 Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe
 100 105 110
 30 Val Gln Trp Phe Val Gly Leu Ser Pro Ile Val Trp Leu Ser Val Met
 115 120 125
 35 Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile Leu Ser Pro
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<210> 28

<211> 1029

45 <212> DNA

<213> hepatitis B virus

<400> 28

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 gctagatccc aragtgagrg gctatactt tcctgctggt ggctccagtt ccggaacagt 180
 55 aaaccctggt ccgactactg cctctcccat atcgtcaatc ttctcgagga ctggggaccc 240
 tgcaccgaat atggagagca caacatcagg attcctagga ccctgctcg tgttacaggc 300

- 31 -

ggggtttttc ttgttgacaa gaatcctcac aataccacag agtctagact cgtgggtggac 360
 5 ttctctcaat tttctagggg gagcaccac gtgtcctggc caaaatttgc agtccccaac 420
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 ggggcgtttt atcatcttcc tcttcatcct gctgctatgc ctcatcttct tgtkggttct 540
 10 tctggactac caaggatatgt tgcccgtttg tcctctactt ccaggaacat caactaccag 600
 cacgggacca tgcaagacct gcacgattcc tgctcaagga acctctatgt ttccctcttg 660
 15 ttgctgtaca aaaccttcgg acggaaattg cacttgattt cccatcccat catcttgggc 720
 tttcgcaaga ttcctatggg agtgggcctc agtcogtttc tcctggctca gtttactagt 780
 gccatttggt cagtgggttcg tagggctttc cccactgtt tggctttcag ttatatggat 840
 20 gatgtgggtat tgggggcaaa gtctgtacaa catcttgaat ccctttttac cgctgttacc 900
 aattttcttt tgtctttggg tatacattta aaccctacta aaactaaacg ttggggctac 960
 25 tcccttaact tcatgggata tgtaattgga agttggggta ccttaccaca ggaacatatt 1020
 gtacacaaa 1029

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 30 <211> 268
 <212> PRT
 <213> hepatitis B virus

<400> 29
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40 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

45 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

50 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

55 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

- 32 -

5 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

10 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125

15 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

20 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

25 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

30 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

35 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

40 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

45 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
 225 230 235 240

50 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
 245 250 255

55 Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys
 260 265

<210> 30
 <211> 226
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 <213> hepatitis B virus
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 <223> Xaa is any amino acid

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 10 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
 35 40 45
 15 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 20 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80
 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Xaa Val
 85 90 95
 25 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
 100 105 110
 30 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala
 115 120 125
 35 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 40 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
 145 150 155 160
 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205
 55 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220

- 34 -

Tyr Ile
225

5
 <210> 31
 <211> 1035
 <212> DNA
 <213> hepatitis B virus

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 15 tagatcccag agtgagggggc ctatactttc ctgctgggtgg ctccagttca ggaacagtaa 180
 accctgttcc gactactgcc tctcccatat cgtcaatctt ctcgaggact ggggaccctg 240
 20 caccgaatat ggagagcacc acatcaggat tcctaggacc cctgctcgtg ttacaggcgg 300
 ggttttttctt gttgacaaga atcctcacia taccacagag tctagactcg tgggtggactt 360
 ctctcaattt tctaggggga gcacccacgt gtcctggcca aaatttgcag tccccaacct 420
 25 ccaatcactc accaacctct tgtcctccaa tttgtcctgg ttatcgctgg atgtgtctgc 480
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 30 tggactacca aggtatgttg ccogtttgtc ctctacttcc aggaacatca actaccagca 600
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 35 tcgcaagatt cctatgggag tgggcctcag tccgtttctc ctggctcagt ttactagtgc 780
 catattgttca gtgggttcgta gggctttccc ccaactgtttg gctttcagtt atatggatga 840
 40 tgtgggtattg ggggccaagt ctgtacaaca tcttgaatcc ctttttaccg ctgttaccaa 900
 ttttcttttg tctttgggta tacatttaaa cccttctaaa accaaacgtt ggggttactc 960
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 45 acacaaaatc aaaca 1035

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 <211> 344
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 <213> hepatitis B virus

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 <223> Xaa is any amino acid

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<400> 32

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 10 Leu Ser Thr Ser Lys Arg Gln Ser Ser Ser Gly His Ala Val Glu Leu
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 15 Gln His Ile Pro Pro Ser Ser Ala Arg Ser Gln Ser Glu Gly Pro Ile
 35 40 45
 Leu Ser Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp
 50 55 60
 20 Tyr Cys Leu Ser His Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys
 65 70 75 80
 25 Thr Glu Tyr Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ala Arg
 85 90 95
 30 Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Thr
 100 105 110
 35 Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Ser Thr
 115 120 125
 His Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr
 130 135 140
 40 Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala
 145 150 155 160
 45 Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro His Leu Leu
 165 170 175
 50 Val Gly Ser Ser Gly Leu Pro Arg Tyr Val Ala Arg Leu Ser Ser Thr
 180 185 190
 55 Ser Arg Asn Ile Asn Tyr Gln His Gly Thr Met Gln Asp Leu His Asp
 195 200 205
 Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Lys Thr

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	210		215		220												
5	Phe	Gly	Arg	Lys	Leu	His	Leu	Tyr	Ser	His	Pro	Ile	Ile	Leu	Gly	Phe	
	225					230					235					240	
10	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu	Ser	Pro	Phe	Leu	Leu	Ala	Gln	
					245					250					255		
15	Phe	Thr	Ser	Ala	Ile	Cys	Ser	Val	Val	Arg	Arg	Ala	Phe	Pro	His	Cys	
				260					265					270			
20	Leu	Ala	Phe	Ser	Tyr	Met	Asp	Asp	Val	Val	Leu	Gly	Ala	Lys	Ser	Val	
		275					280						285				
25	Gln	His	Leu	Glu	Ser	Leu	Phe	Thr	Ala	Val	Thr	Asn	Phe	Leu	Leu	Ser	
		290					295					300					
30	Leu	Gly	Ile	His	Leu	Asn	Pro	Xaa	Lys	Thr	Lys	Arg	Trp	Gly	Tyr	Ser	
	305					310					315					320	
35	Leu	Asn	Phe	Met	Gly	Tyr	Val	Ile	Gly	Ser	Trp	Gly	Thr	Leu	Pro	Gln	
					325					330					335		
40	Glu	His	Ile	Val	His	Lys	Ile	Lys									
				340													
45	<210>	33															
	<211>	344															
	<212>	PRT															
	<213>	hepatitis B virus															
50	<220>																
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	<222>	(309)..(309)															
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	<222>	(327)..(327)															
	<223>	Xaa is any amino acid															
	<400>	33															
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	1				5					10				15			

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Ser Pro Pro Leu Arg Asp Ser His Pro Gln Ala Met Gln Trp Asn Ser
 20 25 30
 5 Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg Val Arg Gly Leu Tyr
 35 40 45
 10 Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr
 50 55 60
 15 Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg Thr Gly Asp Pro Ala
 65 70 75 80
 Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val
 85 90 95
 20 Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln
 100 105 110
 25 Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro
 115 120 125
 30 Thr Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro
 130 135 140
 35 Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg
 145 150 155 160
 Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu
 165 170 175
 40 Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu
 180 185 190
 45 Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile
 195 200 205
 50 Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro
 210 215 220
 55 Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe
 225 230 235 240

- 38 -

Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser
245 250 255

5 Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val
260 265 270

10 Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr
275 280 285

15 Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu
290 295 300

Trp Val Tyr Ile Xaa Thr Leu Leu Lys Pro Asn Val Gly Val Thr Pro
305 310 315 320

20 Leu Thr Ser Trp Asp Met Xaa Leu Glu Val Gly Val Pro Tyr His Arg
325 330 335

25 Asn Ile Leu Tyr Thr Lys Ser Asn
340

30 <210> 34
<211> 980
<212> DNA
<213> hepatitis B virus

35 <400> 34
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tactttcctg ctggtggctc cagttcagga acagtgaagg ctgctcagaa tactgcctct 180
gcatatcgt caaccttctc gaagactggg gaccctgtac cgaacatgga gaacatcgca 240
tcaggactcc taggaccctt gctcgcgtta caggcggggg ttttctcggt gacaaaaatc 300
45 ctcaacaata cacagagtct agactcgtgg tggacttctc tcaattttct agggggaaca 360
cccggtgtgc ttggccaaaa ttgcagctcc caaatctcca gtcactcacc aacttggtgt 420
cctccaattt gtcttggtta tcgctggatg tgtctgcggc gttttatcat ctctctctgc 480
50 atcctgctgc tatgcctcat ctctctgttg gttcttctgg actatcaagg tatgttgccc 540
gtttgtctc taattccagg atcatcaacc accagcaccg gaccatgcag aacctgcacg 600
55 actcctgctc aaggaacctc tatgtttccc tcatgttgct gtacaaaacc tacggacgga 660
aactgcacct gtattcccat cccatcatct tgggctttcg caaaatacct atgggagtg 720

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gcctcagtc cc gtttctcttg gctcagttta ctagtgccgt ttgttcagtg gttcgtaggg 780
 5 ctttccccca ctgtctggct ttcagttata tggatgatgt ggtattgggg gccaaagtctg 840
 tacaacatct tgagtccctt tatgccgctg ttaccaattt tcttttgtct ttgggtatac 900
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 10 ttggggggtg gggctccttg 980

<210> 35
 <211> 258
 15 <212> PRT
 <213> hepatitis B virus
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20 Glu Asp Trp Gly Pro Cys Thr Glu His Gly Glu His Arg Ile Arg Thr
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 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 25 20 25 30
 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 30 35 40 45
 Phe Ser Arg Gly Asn Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 35 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 40 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95
 45 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110
 Ala Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Arg Thr
 115 120 125
 50 Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140
 55 Met Leu Leu Tyr Lys Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

- 40 -

5	Pro	Ile	Ile	Leu	Gly	Phe	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu	Ser
					165					170					175	
10	Pro	Phe	Leu	Leu	Ala	Gln	Phe	Thr	Ser	Ala	Val	Cys	Ser	Val	Val	Arg
				180					185					190		
15	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Met	Asp	Asp	Val	Val
			195					200					205			
20	Leu	Gly	Ala	Lys	Ser	Val	Gln	His	Leu	Glu	Ser	Leu	Tyr	Ala	Ala	Val
		210					215					220				
25	Thr	Asn	Phe	Leu	Leu	Ser	Leu	Gly	Ile	His	Leu	Asn	Pro	His	Lys	Thr
	225					230					235					240
30	Lys	Arg	Trp	Gly	Tyr	Ser	Leu	Gln	Phe	Met	Gly	Tyr	Val	Ile	Gly	Gly
					245					250					255	
35	Trp	Gly														
40	<210>	36														
	<211>	226														
	<212>	PRT														
	<213>	hepatitis B virus														
45	<400>	36														
50	Met	Glu	Asn	Ile	Ala	Ser	Gly	Leu	Leu	Gly	Pro	Leu	Leu	Ala	Leu	Gln
	1				5					10					15	
55	Ala	Gly	Phe	Phe	Ser	Leu	Thr	Lys	Ile	Leu	Thr	Ile	Pro	Gln	Ser	Leu
				20					25					30		
60	Asp	Ser	Trp	Trp	Thr	Ser	Leu	Asn	Phe	Leu	Gly	Gly	Thr	Pro	Val	Cys
			35					40					45			
65	Leu	Gly	Gln	Asn	Ser	Gln	Ser	Gln	Ile	Ser	Ser	His	Ser	Pro	Thr	Cys
		50					55					60				
70	Cys	Pro	Pro	Ile	Cys	Pro	Gly	Tyr	Arg	Trp	Met	Cys	Leu	Arg	Arg	Phe
	65					70					75					80

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Ile Ile Phe Leu Cys Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95

5 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 100 105 110

10 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125

15 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp
 130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
 145 150 155 160

20 Tyr Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175

25 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190

30 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205

35 Leu Ser Pro Phe Met Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Tyr Ile
 225

40 <210> 37
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 <212> DNA
 <213> hepatitis B virus

45 <400> 37
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50 tegtcaatct tctcgaggat tggggaccct gcgctgaaca tggagaacat cacatcagga 120

ttcttaggac cccttctcgt gttacaggcg gggtttttct tgttgacaag aatcctcaca 180

ataccgcaga gtctagactc gtggtggact tctctcaatt ttcgaggggg aactaccgtg 240

55 tgtcttggcc aaaattcgca gtccccaacc tccaatcact caccaacctc ctgtcctcca 300

acttgctctg gttatcgctg gatgtgtctg cggcgtttta tcatmttctt cttcatcctg 360

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ctgctatgcc tcattcttctt gttgggttctt ctggactatc raggtatggt gcccgtttgt      420
cctctaattc caggatcctc awccaccagc acgggaccat gccgaacctg catgactact      480
5  gctcaaggaa cctctatgta tccctcctgt tgetgtacca aacctacgga cggaaattgc      540
acctgtattc ccatcccatc atcctgggct ttcggaanaat tcctatggga gtgggcctca      600
10 gcccgtttct cctggctcag ttacttagtg ccatttggtc agtggttcgt agggctttcc      660
cccactgttt ggctttcagt tatatggatg atgtggtatt gggggccaag tctgtaymge      720
atcttgagtc cctttttacc gctgttacca attttctttt gtctttgggt atacatttaa      780
15 accctaacaa aacaaagaga tgggggttact ctctgaattt tatgggttat gtcattggaa      840
gttatgggtc cttgccacaa gaacacatca tacaaaaaat caaagaatgt tttagaaaac      900
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35 <223> n=any nucleotide

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40 <222> (239)..(239)
<223> n=any nucleotide

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50 Leu Ser Leu Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys Ala Glu
   20             25             30

55 His Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ser Arg Val Thr
   35             40             45

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Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Ala Glu Ser
 50 55 60

5 Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn Tyr Arg Val
 65 70 75 80

10 Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu
 85 90 95

15 Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe
 100 105 110

Tyr His Xaa Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly
 115 120 125

20 Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Asn Ser Arg
 130 135 140

25 Ile Leu Xaa His Gln His Gly Thr Met Pro Asn Leu His Asp Tyr Cys
 145 150 155 160

30 Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Gln Thr Tyr Gly
 165 170 175

35 Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys
 180 185 190

Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln Phe Thr
 195 200 205

40 Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala
 210 215 220

45 Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val Xaa His
 225 230 235 240

50 Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly
 245 250 255

55 Ile His Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn
 260 265 270

Phe Met Gly Tyr Val Ile Gly Ser Tyr Gly Ser Leu Pro Gln Glu His

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275 280 285
 5 Ile Ile Gln Lys Ile Lys Glu Cys Phe Arg Lys
 290 295

 10 <210> 39
 <211> 259
 <212> PRT
 <213> hepatitis B virus

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 15 <222> (134)..(134)
 <223> Xaa is any amino acid

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 <223> Xaa is any amino acid

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 <223> Xaa is any amino acid

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 20 25 30

 40 Asn Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu
 35 40 45

 45 Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser
 50 55 60

 50 Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Arg Gly Gly Thr Thr Val
 65 70 75 80

 Cys Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr
 85 90 95
 55

 Ser Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg

- 45 -

	100	105	110	
5	Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu 115 120 125			
10	Val Leu Leu Asp Tyr Xaa Gly Met Leu Pro Val Cys Pro Leu Ile Pro 130 135 140			
15	Gly Ser Ser Xaa Thr Ser Thr Gly Pro Cys Arg Thr Cys Met Thr Thr 145 150 155 160			
20	Ala Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Thr 165 170 175			
25	Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly 180 185 190			
30	Lys Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu 195 200 205			
35	Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp 210 215 220			
40	Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Xaa 225 230 235 240			
45	Ile Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp 245 250 255			
50	Val Tyr Ile			
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	gaacatggag aacatcacat caggattcctt aggaccctt ctcgtgttac aggcgggggtt	180		
	tttcttggtg acaagaatcc tcacaatacc gcagagtcta gactcgtggt ggacttctct	240		

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caattttcta gggggaacta ccgtgtgtct tggccaaaat tcgcagtccc caacctccaa 300
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 5 ttttatcatc ttctcttca tctgtgtgt atgcctcatc ttcttggttg ttcttctgga 420
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 15 tgttcagtgg ttcttagggc tttccccac tgtttggctt tcagttatat ggatgatgtg 720
 gtattggggg ccaagtctgy acagcatctt gagtcccttt ttaccgcggg gaccaatttt 780
 20 cttttgtctt tgggtataca tttaaacct aacaaaacaa agagatgggg ttactctctg 840
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 40 Leu Ser Pro Asn Ser Ala Arg Ser Pro Cys Trp Trp Leu Gln Phe Arg
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 Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser Leu Ile Val Asn Leu
 20 25 30
 45 Leu Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg
 35 40 45
 50 Ile Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp
 50 55 60
 55 Lys Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser
 65 70 75 80

	Gln	Phe	Ser	Arg	Gly	Asn	Tyr	Arg	Val	Ser	Trp	Pro	Lys	Phe	Ala	Val
					85					90					95	
5	Pro	Asn	Leu	Gln	Ser	Leu	Thr	Asn	Leu	Leu	Ser	Ser	Asn	Leu	Ser	Trp
				100					105					110		
10	Leu	Ser	Leu	Asp	Val	Ser	Ala	Ala	Phe	Tyr	His	Leu	Pro	Leu	His	Pro
			115					120					125			
15	Ala	Ala	Met	Pro	His	Leu	Leu	Val	Gly	Ser	Ser	Gly	Leu	Ser	Arg	Tyr
		130					135					140				
20	Val	Ala	Arg	Leu	Ser	Ser	Asn	Ser	Arg	Ile	Leu	Asn	His	Gln	His	Gly
	145					150					155					160
25	Thr	Met	Pro	Asn	Leu	His	Asp	Tyr	Cys	Ser	Arg	Asn	Leu	Tyr	Val	Ser
					165					170					175	
30	Leu	Leu	Leu	Leu	Tyr	Gln	Thr	Tyr	Gly	Arg	Lys	Leu	His	Leu	Tyr	Ser
				180					185					190		
35	His	Pro	Ile	Ile	Leu	Gly	Phe	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu
			195					200					205			
40	Ser	Pro	Phe	Leu	Leu	Ala	Gln	Phe	Thr	Ser	Ala	Ile	Cys	Ser	Val	Val
		210					215					220				
45	Arg	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Met	Asp	Asp	Val
	225					230					235					240
50	Val	Leu	Gly	Ala	Lys	Ser	Xaa	Gln	His	Leu	Glu	Ser	Leu	Phe	Thr	Ala
					245					250					255	
55	Val	Thr	Asn	Phe	Leu	Leu	Ser	Leu	Gly	Ile	His	Leu	Asn	Pro	Asn	Lys
				260					265					270		
60	Thr	Lys	Arg	Trp	Gly	Tyr	Ser	Leu	Asn	Phe	Met	Gly	Tyr	Val	Ile	Gly
			275					280					285			
65	Ser	Tyr	Gly	Ser	Leu	Pro	Gln	Glu	His	Ile	Ile	Gln	Lys	Ile	Lys	Glu
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 25 Thr Val Asn Pro Val Pro Thr Thr Ala Ser Pro Leu Ser Ser Ile Phe
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 30 Ser Arg Ile Gly Asp Pro Ala Arg Asn Met Glu Asn Ile Thr Ser Gly
 35 40 45
 Phe Leu Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr
 50 55 60
 35 Arg Ile Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu
 65 70 75 80
 40 Asn Phe Leu Gly Gly Thr Thr Val Cys Leu Gly Gln Asn Ser Gln Ser
 85 90 95
 45 Pro Thr Ser Asn His Ser Pro Thr Ser Cys Pro Pro Thr Cys Pro Gly
 100 105 110
 Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu
 115 120 125
 50 Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Xaa Gly Met
 130 135 140
 55 Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr Ser Thr Gly
 145 150 155 160

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Pro Cys Arg Thr Cys Met Thr Thr Ala Gln Gly Thr Ser Met Tyr Pro
5 165 170 175

Ser Cys Cys Cys Thr Lys Pro Thr Asp Gly Asn Cys Thr Cys Ile Pro
180 185 190

10 Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp Ala Ser
195 200 205

15 Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe
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20 Val Gly Leu Ser Pro Thr Val Trp Leu Ser Val Ile Trp Met Met Trp
225 230 235 240

Tyr Trp Gly Pro Ser Leu Xaa Ser Ile Leu Ser Pro Phe Leu Pro Arg
245 250 255

25 Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile
260 265

30